# VOICE BROWSING WHILE WAITING IN A HOLD QUEUE
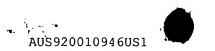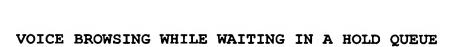
5          **CROSS-REFERENCE TO RELATED APPLICATIONS**

The present application is related to the following co-pending applications, incorporated herein by reference:

10          (1) U.S. Patent Application Serial No. ___/_____ (Attorney Docket No. AUS920010944US1);

(2) U.S. Patent Application Serial No. ___/_____ (Attorney Docket No. AUS920010945US1);

15          (3) U.S. Patent Application Serial No. ___/_____ (Attorney Docket No. AUS920010947US1); and

(4) U.S. Patent Application Serial No. ___/_____ (Attorney Docket No. AUS920010948US1).

## BACKGROUND OF THE INVENTION

### 1.    Technical Field:

The present invention relates in general to telecommunications and, in particular, to call hold centers. Still more particularly, the present invention relates to voice browsing while on hold in a call queue.

### 2.    Description of the Related Art:

Many companies provide telephone-based access to help staff, sales personnel, representatives, and automated menus via a call center. Where high telephone call traffic is typical in telephone access to a company's representatives, a PBX system receives the call and distributes the call to an automatic call distributor (ACD), thus incorporating a hold function in the call center. ACDs are often employed to provide an even and systematic distribution of incoming calls to multiple representatives. In particular, ACDs typically provide incoming calls with a direct connection to an available representative until all representatives are busy. Then, calling parties are placed in a call queue, and selectively connected to a representative once a representative comes available.

Call queues may cause frustration and ill will of consumers towards a company, particularly where excessively long waits, full queues and accidental disconnects are encountered. One way to alleviate some of the frustration associated with call queues is by allowing the caller to select from a menu of multiple services while waiting. Such services may include music, news, weather, release of a the line to call a third-party, transfer of

the call to a chat room of other callers on hold, competitions, and other activities in which callers may participate while on hold.  While participating in the services, the caller may receive periodic updates as to a position in the queue and an

5        estimated wait time remaining.

In order to provide the caller with a menu of services, interactive voice response units (IVRU) are often utilized.  For example, a caller placed in a queue of a call center may be

10      enabled to access multiple entertainment options while on hold. An IVRU provides the caller with a menu of available entertainment options accessible while on hold.  While IVRU systems provide a method for prompting a caller to select from a menu and then automating a transcript of information selected by

15      the caller, IVRU systems are costly and are limited only to output of transcripted information.  For example, a news transcript is output as a news service.  However, the news transcript may not cover a particular news item of interest to the caller.

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In view of the foregoing, it would be advantageous to provide a method, system, and program for allowing a caller to browse web pages while on hold in a call queue.  In addition, it would be advantageous to provide a method, system, and program

25      for allowing a caller to browse a selection of web pages that are specified for the caller according to a caller profile while the caller is on hold in a call queue.

# SUMMARY OF THE INVENTION

In view of the foregoing, it is therefore an object of the present invention to provide an improved telecommunications system.

It is another object of the present invention to provide a method, system and program for improved call hold queues.

It is yet another object of the present invention to provide a method, system and program for voice browsing while on hold in a call queue.

According to one aspect of the present invention, callers waiting in a hold queue are prompted to select a help subject for a call. A specified menu of browsable help information is output to the caller according to the help subject selected by the caller. Then, a web script is translated into audio output to the caller for the caller's selection from the specified menu of browsable help information.

All objects, features, and advantages of the present invention will become apparent in the following detailed written description.

## BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims.  The invention itself however, as well as a preferred mode of use, further objects and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

**Figure 1** depicts a block diagram of a network call or contact center system in which the present invention may be implemented;

**Figure 2** illustrates a block diagram of a voice browsing system in accordance with the method, system, and program of the present invention;

**Figure 3** depicts a block diagram of an on hold system in accordance with the method, system, and program of the present invention;

**Figure 4** illustrates an illustrative embodiment of scripts that may be utilized to direct caller browsing according to a queue subject in accordance with the method, system, and program of the present invention;

**Figure 5** depicts a high level logic flowchart of a process and program for controlling a PBX system within a call center in accordance with the method, system, and program of the present invention; and

**Figure 6** illustrates a high level logic flowchart of a process and program for controlling an on hold system in

accordance with the method, system, and program of the present
invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A method, system, and program for voice browsing while waiting in a hold queue are provided.  Advantageously, voice browsing allows a caller to browse web pages written in a voice extensible markup language (XML) language.  In addition, voice browsing preferably provides for browsing web pages in other formats including, but not limited to, HTML, XML, Java and other scripting languages through transcoding the pages into voice XML or an alternate audio format.

For purposes of the present invention, a call center may be accessed via multiple networks including, but not limited to, wireline, wireless, and PSTN networks.  In addition, a call center may incorporate multiple elements including, but not limited to, a private exchange switching (PBX) systems, automatic call distribution (ACD) systems, on hold systems, voice browsers, interactive voice response units (IVRU), and other systems which typically control a call center.

In the following description, for the purposes of explanation, numerous specific details are set forth to provide a thorough understanding of the present invention.  It will be apparent, however, to one skilled in the art that the present invention may be practiced without these specific details.  In other instances, well-known structures and devices are shown in block diagram form to avoid unnecessarily obscuring the present invention.

The present invention may be executed in a variety of systems, including a variety of computing systems and electronic devices under a number of different operating systems.  In one embodiment of the present invention, the on hold call queue

system is a computer system that incorporates communication features that provide telephony, messaging, and information services to a plurality of callers. In general, the present invention is preferably executed in a computer system that performs computing tasks such as manipulating data in storage that is accessible to the computer system.

With reference now to the figures, and, in particular, with reference now to **Figure 1**, there is an illustrative network call or contact center environment in which the present invention may be implemented. It will be appreciated by one with skill in the art that although a particular network environment is described below, the invention is not limited to use within the described network environment, rather, the inventive queue position advancement process may be implemented within any on-hold information service regardless of the telephony environment.

As illustrated, multiple incoming calls are received at a call center **16**. In particular, a private branch exchange switch PBX **10** with automatic call distribution (ACD) ability receives incoming calls via truck **23**, where trunk **23** is connected to a network of wireline, wireless, Internet Protocol (IP) networks, and PSTN connections. In particular, PBX systems are well known in the art as switching systems designed to received telephone calls destined for call center **16** and to queue those call when a call handling agent is not available.

PBX **10** distributes incoming calls to multiple representative terminals **18a-18n** via trunk **24**. In particular, PBX **10** receives incoming calls via trunk **23** from multiple terminals **8a-8n**, wherein terminals **8a-8n** may represent, but are not limited to, conventional wireline telephone systems, wireless phones, video phones, personal computers, pervasive computing devices

configured with appropriate telephony software and Internet connectivity, telephone stations, other PBXs, or switching systems.

5      In the description which follows, it will be assumed that all representative terminals **18a-18n** are busy and therefore PBX **10** cannot respond to an incoming call by making a direct connection to one of representative terminals **18a-18n**. As a result, PBX **10** is forced to place the incoming call on hold. In 10     addition, PBX **10** determines the calling telephone number from caller ID or other methods.

After placing the incoming call on hold, the call and caller ID, time of call, and other information obtained by PBX **10** are forwarded to on hold system **12**. On hold system **12** preferably 15     creates a record based on the call and positions the call within a call queue. While in the present embodiment PBX **10** forwards calls to a single on hold system, in alternate embodiments, PBX **10** may forward calls to multiple on hold systems. In addition, 20     on hold system **12** and other on hold systems may be coupled to PBX **10** or may be remotely accessed by PBX **10**. Further, while in the present embodiment on hold system **12** is depicted as an independent system, on hold system **12** may also be incorporated within PBX **10**.

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While the call is on hold, an interactive voice response unit (IVRU) **13**, coupled to PBX **10** and on hold system **12**, may offer the caller a menu of available options for receiving call hold queue information for on hold system **12**. In general, IVRU 30     **13** is a voice information system which may be arranged to (i) prompt a caller for specific information by asking questions based on a set of modules in a transactions script, (ii) collect

that information by detecting and interpreting dual tone multifrequency (DTMF) signals entered by the caller or by recognized speech input by the caller, (iii) organize the collected information in a specific format and (iv) forward the

5 collected information to be utilized within on hold system **12**. For purposes of the present invention, prompts to the caller may be in voice, text, video, and/or graphical formats depending on the interface receiving the prompt. Alternatively, a voice browser may be implemented in lieu of IVRU **13**, where voice XML

10 pages provide the script for the menu of available options.

According to one advantage of the present invention, a voice browser **20** is also implemented within on hold system **12**. Voice browser **20** is utilized for browsing the Internet and in

15 particular for browsing pages stored at help server **22**.

Help server **22** preferably includes web scripts that may be output to multiple devices including computer systems via a web browser and telephony devices via a voice browser. In particular, the scripts may include help information that is

20 searchable by a user through a web browser, but is also searchable by a caller via a voice browser.

For an IVRU to play the help information to a caller, the information would need to be stored in a script that is readable

25 by the IVRU. In addition, redundant copies of the same information would be stored in multiple places including the web server and the IVRU. However, according to the present invention, browsable scripts only need be stored in one location to service callers and web surfers.

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With reference now to **Figure 2**, there is an illustrative block diagram of a voice browsing system in accordance with the method, system, and program of the present invention. For

purposes of the present invention, help server **22** is a web based server communicatively connected to network **19**. As depicted, help server **22** includes a controller **24** for controlling the operations of help server **22**. In particular controller **24** may

5　　include at least one processor, memory, data storage, system software, and application software.

In addition, help server **22** includes multimedia database **26** and audio/grammar database **30**. Multimedia database **26** may

10　　include graphics, sound, video and other data that may be read by a web browser **38** executing on computing system **36**. Help server **22** also includes audio/grammar database **30** for directing voice browser **20** in converting voice XML into audio output.

15　　Further, help server **22** includes scripts **28**. Scripts **28** includes programmed web pages that may be output as HTML documents **32** or voice XML documents **34**. HTML documents **32** are preferably transmitted to a computing system for output via a display interface controlled by web browser **38**. Voice XML

20　　documents are preferably converted into audio output by voice browser **20** and output via a telephony device **40**. Telephony device **40** may include a wireline phone, a wireless phone, a PDA with telephony features, and other computing devices with telephony features that provide audio input and output.

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In the present invention, scripts **38** preferably include information including, but not limited to, directions, frequently asked questions, product and service specifications, product and service advertising, and other information which may be visibly

30　　and audibly output. Scripts **38** are preferably designed in a hierarchy according to subject, such that a user or caller may easily transition from one page to the next within a particular

subject.   Further, scripts **38** allow for a user of computing system **36** or a caller from telephony device **40** to receive the same help information.

5          In addition, in the present invention, voice browser **20** includes audio output(computer-synthesized and/or recorded) and audio input(voice and/or keypad tones).   Importantly, voice browser **20** connects the Internet with a phone network in order to extend the power of the web to telephony devices while a call
10         placed via those telephony devices is waiting on hold.

           Referring now to **Figure 3,** there is an illustrative block diagram of an on hold system in accordance with the method, system, and program of the present invention.   As illustrated, on hold system **12** includes a controller **50**, call hold queues **52a-52n**, a network interface **54**, voice browser **20**, and a data storage system **58** communicatively connected via a bus **56**.   Additional systems may be connected along bus **56** that are not depicted herein.   In particular, controller **50** comprises conventional
20         computer resources including, but are not limited to, at least one processor, memory, a data storage system, system software and application software, that function together to perform the functions described with reference to controller **50**.

25         Network interface **54** preferably communicates with PBX **10** via a telephone network and network **19** via a network connection such as a wide area network (WAN) connection.   In particular, network interface **54** receives transfers of calls from PBX **10** and then returns calls to PBX **10** when a call is the next in line within
30         one of call hold queues **52a-52n**.

In the present invention, voice browser **20** preferably controls audio output and detects audio inputs of voice and/or keypad tones.  In particular, voice XML documents for controlling initial menu options to a caller may be stored in call queue

5          options database **62**.  Alternatively, such voice XML documents may be stored remotely, such as at help server **22**, and accessed via network **19**.

For example, when a call is first received at on hold system

10        **12**, a first voice XML scripted document may be utilized to prompt and direct the placement of a call within one of call hold queues **52a-52n**.  In particular, a caller may be given the option of selecting between multiple subject matters or skills, where each of call hold queues **52a-52n** is specified according to a subject

15        matter or skill.  When calls are next in line to be transferred to a representative, the subject matter or skill of the queue determines which representatives may receive the call.

Then, depending on the call hold queue, multiple service

20        options are presented to the caller according to a voice XML scripted document controlled by voice browser **20**.  Service options may include, but are not limited to, browsing web pages specified for the queue, browsing the web in general, listening to music, news or weather, making a third-party call, and other

25        activities.

According to an advantage of the present invention, the subject and service options are first filtered according to the caller profile associated with the caller ID of the call, such

30        that the caller is only presented with those options that are specifically designated by the caller and those options which are tailored to the caller according to the caller profile.  Caller profiles may be stored in caller profile database **60** and/or

accessed from a remote caller profile server via network **19**, as described in U.S. Patent Application Serial No. __/____ (Attorney Docket No. AUS920010944US1).

5      In addition, to filtering subject and service options to only present preferred types of options, any output directed by voice browser **20** to a caller may be specified by a caller's profile.  In particular, the language, dialect, speed, volume and other characteristics of output to a caller may be specified by
10     the caller's profile.

       In the present invention, where a caller selects to browse the web according to the subject matter of a particular queue, the caller is then provided with topics of web pages that are
15     associated with the particular queue.  In particular, it is advantageous to direct the caller to particular web pages, such that the caller does not have to manually through a hierarchy of web pages in order to find information relevant to a caller's question or problem.
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       Call queue browser filtering database **64** preferably includes a database of web pages specified according to topic and voice XML scripts for directing a caller to select from the database of web pages.  For example, if a caller selects to receive help with
25     a printer issue, then the caller is placed in a printer related call queue.  A hierarchy of available web pages relating to printer issues is included in call queue browser filtering database **64** with prompts for a caller that will direct the caller to one of the available web pages relating to printer issues..
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       In addition, the caller may select to browse the web in general where the caller may then input via voice or keypad a web address to begin browsing.  Where a caller selects to listen to

music, news or weather, the caller may further indicate a web site that is a preferred source for this information.  In particular, a menu of typical web sites preferred by callers may be provided such that the caller does not have to enter a

5      specific web address.

With reference now to **Figure 4,** there is an illustrative embodiment of scripts that may be utilized to direct caller browsing according to a queue subject in accordance with the

10     method, system, and program of the present invention.  As depicted, scripts **70** and **72** are voice XML scripted documents specified according to the call hold queue that a caller is positioned within.

15     Script **70** details audio output and associated input for a call hold queue for help with modems while script **72** details audio output and associated input for a call hold queue associated with networks.

20     Preferably the caller is asked to select from among options with designated voice or keypad inputs.  For example, if a caller in the modem call hold queue inputs a "1", the voice browser will begin to browse a web page script for frequently asked questions about modems.

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The voice XML script requested by a voice browser in response to a caller input is indicated in brackets.  Therefore, in the previous example, where the caller in the modem call hold queue inputs a "1", the voice browser will request a voice XML

30     document stored in a web page hierarchy at "help/faq/modems". Alternative types of addressing may be utilized for requesting pages.

Scripts, such as script **70** or script **72**, may include multiple levels of options. For example, if a caller in the model call hold queue inputs a "1", the voice browser will move to the next level of options in the script that asks the caller to select from multiple options that specify the type of modem. By providing multiple levels of options, the script may prompt the caller to narrow the caller's question to the most relevant information and then retrieve a voice XML script for the web page with the most relevant information.

Referring now to **Figure 5**, there is depicted a high level logic flowchart of a process and program for controlling a PBX system within a call center in accordance with the method, system, and program of the present invention. As illustrated, the process starts at block **80** and thereafter proceeds to block **82**.

Block **82** depicts a determination as to whether a new call is received. If a new call is received, then the process passes to block **88**. If a new call is not received, then the process passes to block **84**. Block **84** illustrates a determination as to whether or not a call processing request is received. When a call is at the top of the call queue, the call is preferably transferred back to the PBX with a call processing request. If a call processing request is not received, then the process passes to block **82**. If a call process request is received, then the call is transferred to the next available representative, as depicted at block **84**, and the process ends.

Block **88** illustrates a determination as to whether or not a representative is available. If a representative is available, then the call is transferred to the next available

representative, as illustrated at block **90,** and the process ends.
If a representative is not available, then the process passes to
block **92.**   Block **92** depicts identifying the caller ID associated
with the call.   Next, block **94** illustrates distributing the call

5      to the on hold system, and the process ends.


With reference now to **Figure 6,** there is depicted a high
level logic flowchart of a process and program for controlling an
on hold system in accordance with the method, system, and program

10     of the present invention.   As illustrated, the process starts at
block **100** and thereafter proceeds to block **102.**


Block **102** depicts a determination as to what event occurred
when an event occurs.   If a new call is received, then the

15     process passes to block **104.**   If a call is detected as being the
next in line in a queue, then the process passes to block **122.**


Block **104** illustrates playing a menu of queue options to a
caller.   As previously described, the menu of queue options and

20     other output to a caller may be specified according to a caller
profile detected according to caller ID.


Next, block **106** illustrates a determination as to whether a
caller has selected from the menu options.   If a caller does not

25     select from the menu options, then the call is placed in a
default queue, as illustrated at block **110,** and the process ends.
If a caller does select from the menu options, then the process
passes to block **108.**


30     Block **108** depicts placing the call in one of the multiple
queues depending on the menu selection.   Next, block **112**
illustrates playing tailored browsing options to the caller

according to the queue.   In addition other service options may be presented to the caller.   Further, where there is only one queue, rather than multiple queues, browsing options may be offered for callers in the one queue.

Block **114** depicts a determination as to whether the caller selects a browser option.   The process may iterate at block **114** for a period of time if no browser option is selected.   When a browser option is selected, then the process passes to block **116**.

Block **116** illustrates transmitting a request for a documents of particular browser selection to the help server.   Next, block **118** depicts a determination as to whether the selected documents are received in voice XML.   If the selected documents are received in voice XML, then the voice XML documents are translated by the voice browser into audio output to the caller, as depicted at block **120,** and the process ends.   If the selected documents are not received in voice XML, then translation and transcoding of the documents into the voice XML format is performed, as illustrated at block **119**, before the process passes to block **120.**

In response to the call being next in line in a queue, the caller is notified of the next in line status, as illustrated at block **122**.   Next, block **124** depicts a determination as to whether the caller indicates a readiness to transfer to a representative. According to the advantage of the present invention, the caller may access needed information by voice browsing and no longer needs the assistance of a representative.   If the caller does not indicate a readiness to transfer to a representative, then the call is removed from the queue, as illustrated at block **128,** and the process ends.   If a caller does indicate a readiness to transfer to a representative, then the process passes to block

**126.**  Block **126** depicts transferring the call to the PBX system to be transferred to a representative according to the menu option(or queue subject) selected by a caller, and the process ends.

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It is important to note that while the present invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are

10    capable of being distributed in the form of a computer readable medium of instructions and a variety of forms and that the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution.  Examples of computer readable media include

15    recordable-type media, such as a floppy disk, a hard disk drive, a RAM, CD-ROMs, DVD-ROMs, and transmission-type media, such as digital and analog communications links, wired or wireless communications links using transmission forms, such as, for example, radio frequency and light wave transmissions.  The

20    computer readable media may take the form of coded formats that are decoded for actual use in a particular data processing system.

While the invention has been particularly shown and
25    described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention.